

## INFORMATION SHEET

WASTE DISCHARGE REQUIREMENTS ORDER NO. R5-2003-0052  
UNITED STATES DEPARTMENT OF THE AIR FORCE  
FORMER McCLELLAN AIR FORCE BASE  
GROUND WATER EXTRACTION AND TREATMENT SYSTEM  
SACRAMENTO COUNTY

### **Site Description and Background**

The former McClellan Air Force Base (Base) is approximately eight miles northeast of downtown Sacramento in North Highlands. As part of the Base Realignment and Closure (BRAC) Program, the Base was officially closed on 13 July 2001. Clean-up of the former Base is currently supervised by the Department of Defense (DOD) Installation and Restoration Program (IRP). The IRP is designed to manage the overall DOD activities with respect to past waste disposal practices and site remediation. This program has identified 318 sites on the former Base. The cleanup of IRP sites, and reuse and transfer of the former base property, is being directed by the Air Force Real Property Agency (hereafter Discharger). To date, seven Operable Units (OUs) have been identified for evaluation under the McClellan Federal Facilities Agreement (FFA). Many contamination source areas have been identified and found to have soil and ground water contamination due to buried and burned wastes, spills, unregulated disposal practices, leaking underground storage tanks, and industrial activities on the former Base. Contamination is found to extend from the surface to 150 to 200 feet in depth and includes many volatile organic compounds, semi-volatile compounds, and heavy metals.

### **Groundwater Extraction and Treatment System**

One of the first sites to be addressed was Site S in OU D, located in the northwest portion of the former Base. The plan for controlling and remediating the contamination in OU D included: removing 20,000 cubic yards of soils and sludges; installing a plastic membrane and soil cap to stop rainfall infiltration into the contaminated area, and; operation of a groundwater extraction and treatment system. The latter element was designed to create a cone of depression beneath the OU D contamination and prevent further migration of pollutants. It was deemed impractical to remove the contamination to a depth of 150 feet.

The Discharger owns and operates this ground water extraction and treatment system (GWTS) to extract ground water contaminated with volatile organic compounds (VOC's), remove the contaminants, and discharge the treated water. Currently, the GWTS receives approximately 80 gallons per minute (gpm) from six extraction wells in OU D. Since 1988, an additional 250 gpm has been derived from a three well extraction system in Operable Unit C. A third extraction system was completed in Operable Unit B in 1992 that produces 200-300 gpm. Additional extraction wells have been completed in Operable Units B and C and were connected to the treatment system in late 1995 bringing the extraction total to approximately 800 gpm. Contribution from another round of groundwater extraction well construction in Operable Units A, B, and C in 1998 and early 1999 brought the influent flow to the plant to approximately 1500 gpm.

The GWTS includes an ultraviolet/peroxide (UVOX) system, an air stripper, and granular activated carbon vessels. The UVOX system was designed to reduce the concentration of volatile organics from a select group of extraction wells. In January 2002, the UVOX system was bypassed and shut

down because lower concentrations of contaminants entering the system make UVOX treatment unnecessary. The UVOX system was designed to reduce contaminant loading from specific wells, particularly contaminants that use a significant amount of carbon during treatment (such as vinyl chloride and chlorinated ethanes). ~~The UVOX system will remain in place at the GWTP in case it is needed in the future.~~ The UVOX system was restarted in September 2003 to reduce 1,4-dioxane concentrations entering the GWTP from the Operable Unit (OU) D and northern OU C extraction wells. The UV/OX System was decommissioned in July 2005.

The air-stripper is designed to treat up to 2000 gpm and remove approximately 99% of the volatile organics in the groundwater entering the stripper. The off-gas from the stripper is treated by concentrating the contaminants and then using a thermal oxidation unit to destroy the contaminants. A scrubber is utilized to remove acid generated during the thermal destruction process.

Granular activated carbon (GAC) trains are utilized for effluent polishing. Each GAC train consists of two vessels, operated in either parallel or series. Each GAC contact vessel is 10 feet in diameter and 10 feet in length, providing 10.5 minutes of contact. One train operates at 500 gpm, while the other three trains operate at 350 gpm. The GWTS configuration will change to accommodate the Ion Exchange (IX) Hexavalent Chromium Full Scale Treatment system. Two vessels will be used in series (lead/lag) to accommodate the new IX system operating at flows of up to 750 gpm. The other six vessels will be operated in parallel for VOC polishing. Once the Phase III wells are added the total flow will become about 2000 gpm.

The GWTS is currently designed to treat a maximum of ~~2.4688~~ million gallons per day (mgd) of extracted groundwater. When Phase III extraction wells become operational, the treatment capacity will likely increase to approximately ~~3.62.64~~ mgd. Phase III is anticipated to be completed in 200~~65~~. Treated groundwater is subsequently discharged to Magpie Creek, tributary to the Magpie Creek Diversion, tributary to Robla (Rio Linda) Creek, tributary to the Natomas East Main Drainage Canal, tributary to the Sacramento River. ~~A small portion of the flow, up to 0.144 mgd, is also discharged to a wetland which drains to adjacent Don Julio Creek, which is tributary to Magpie Creek.~~ All of these are waters of the United States, in Section 24, T19N, R5E, MDB&M as shown in Attachment A, incorporated herein and made a part of this Order.

The discharge is described as follows:

Average flow:	2. <del>4688</del> 64 mgd (1833 gpm)
Design flow:	2. <del>4688</del> mgd (2000 gpm)
Average temperature:	72 °F summer; 60 °F winter

<u>Constituent</u>	<u>Units</u>
Suspended Matter	< 5 mg/L (ppm)*
pH	6.5 - 8.5

\* milligrams/Liter (parts per million)

The discharge was previously regulated by Order No. 99-067 adopted by the Regional Board on 11 June 1999. This Order expired on 1 July 2001. The Discharger did not submit a Report of Waste Discharge to revise Order No. 99-067, but did submit information necessary for permit renewal in several other documents. The Discharger has stated that they are not required to obtain a permit as CERCLA allows for an exemption from the necessity of obtaining a permit for onsite remedial response activities. However, one of the requirements that allows the exemption is that all substantive requirements that would be contained in the permit must be in the CERCLA decision document that governs the activity that would be permitted. An Interim Record of Decision (IROD) was signed in the summer of 1995 which does not contain all the substantive requirements contained in the NPDES permit. The substantive requirements are also known as Applicable, Relevant, and Appropriate Requirements (ARARs). Since the appropriate decision document, the IROD, does not contain all of the necessary ARARs, the NPDES permit is necessary to regulate the discharge.

### Receiving Waters

As shown in Attachment A, a part of this Order, up to 2.4688 mgd of treated groundwater may be discharged from the GWTS via Outfall 001 to **Magpie Creek**. ~~When the Phase III wells become operational, the projected maximum discharge is expected to increase to 3.6 mgd. This Order may be reopened prior to expiration to consider this increase in flow. A portion of the 2.16 mgd currently discharged by the GWTS, up to 0.144 mgd, may be discharged via Outfall 002 to a wetlands area (Beaver Pond) which drains to adjacent Don Julio Creek, which is tributary to Magpie Creek east of the Base boundary and east of Raley Boulevard.~~ According to documents provided by the Discharger (IRP Creeks and Floodplains Conceptual Site Model, 4 June 2002), Magpie Creek originates to the east of the Base boundary, in the Foothill Farms area, flowing in general from east to west through the Base. The tributary land area of Magpie Creek is approximately 4 square miles. Magpie Creek carries flows onto the Base through a set of culverts under Roseville Road. Magpie Creek conveys water across the developed portions of the Base through a series of channels and underground pipes. Portions of the Magpie Creek channel have been modified, at various times since 1945, from their original course. Within much of the Base, Magpie Creek is lined with concrete, gunite, or corrugated steel half-pipe. Downstream of Outfall 001 at Lang Avenue, the modified creek channel connects with the old alignment of Magpie Creek. From this point west to Raley Boulevard, Magpie Creek follows its original course and has not been re-routed or channelized.

~~Don Julio Creek originates east of the Base, in the North Highlands area. Don Julio Creek also flows, in general, from east to west, entering the Base at near James Way via two 60-inch diameter culverts. After entering the Base, flow in Don Julio Creek is conveyed underground, resurfacing on the west side of the Base. In addition, a pair of creeks or drainage ditches originating from the Building 772 and 774 areas also feed into Don Julio Creek. Don Julio Creek then exits the Base, flows through a residential area, and re-enters the Base near the northwest corner. From there the creek continues as a gunite lined ditch and flows south along Patrol Road, turning west near the~~

~~center of the Base and exiting the Base near Raley Boulevard. Absent the discharge of treated groundwater from the GWTS, there are periods of limited or no flow in Magpie Creek and Don Julio Creek.~~

Off the Base and west of Raley Boulevard, Magpie Creek and Don Julio Creek flow into the Magpie Creek Diversion which empties into Robla (Rio Linda) Creek. This diversion was constructed in the 1950s to alleviate flooding along the lower reaches of Magpie Creek by diverting water to Robla Creek. Robla Creek, in turn, empties into the Natomas East Main Drainage Canal (NEMDC). From this point the NEMDC flows south to the north side of the American River, then turns west, paralleling the American River before emptying into the Sacramento River just north of Discovery Park, upstream from the confluence with the American River.

The GWTS is configured to allow for diversion of the effluent discharge from Outfall 001 to the sanitary sewer at times when the effluent quality is uncertain and may potentially exceed the NPDES permit effluent limitations (e.g. pollutant slug flows during system start-up). Discharge to the sanitary sewer is conducted pursuant to an industrial discharge permit with the Sacramento Regional County Sanitation District (District). On 31 December 2004 the District issued a revised sanitary sewer discharge permit which reduced the monthly volume of treated groundwater which could be discharged to the sanitary sewer from 45 million gallons to 3.3 million gallons.

Considering the new sanitary sewer flow limitations, there may be instances when it is no longer possible to operate the GWTS at full capacity for the time required to sample and characterize the effluent quality and determine whether it complies with the NPDES permit effluent limitations, and/or make treatment process adjustments to ensure consistent compliance with the NPDES permit effluent limitations. The Discharger has two storage basins which can provide up to 10 million gallons of treated effluent temporary storage to support the GWTS restart protocol. The Discharger has configured these storage basins to allow for temporary storage of treated effluent during the restart protocol. The stored effluent may subsequently be discharged back to Outfall 001 or metered at a slower rate into the sanitary sewer as the new industrial permit allows after the effluent has been characterized.

This reconfiguration of the system was designed in response to the new restrictions on the amount of water which may be discharged to the sanitary sewer. The purpose of this reconfiguration is to ensure compliance with effluent limitations in both the NPDES permit and industrial discharge permit prior to discharge. In accordance with 40 CFR 122.29 discharge from the storage basins to Don Julio Creek does not represent a 'new source' as the storage basins are facilities used in connection with feasibility, engineering, and design studies regarding the source or water pollution treatment for the source. The temporary storage basins do not replace the process or production equipment that causes the discharge of pollutants at an existing source, and are not substantially independent of the existing source at the same site. Treated effluent discharged from the temporary storage basins via Outfall 001 must meet the same limitations as prescribed for effluent discharged from Outfall 001.

A portion of the 2.88 mgd currently discharged by the GWTS, up to 0.144 mgd, may be discharged via Outfall 002 to a wetlands area (Beaver Pond) which drains to adjacent **Don Julio Creek**, which is tributary to Magpie Creek east of the former McClellan AFB (Base) boundary and east of Raley Boulevard. Don Julio Creek originates east of the Base, in the North Highlands area. Don Julio Creek also flows, in general, from east to west, entering the Base near James Way via two 60 inch diameter culverts. After entering the Base, flow in Don Julio Creek is conveyed underground, resurfacing on the west side of the Base. In addition, a pair of creeks or drainage ditches originating from the Building 772 and 774 areas also feed into Don Julio Creek. Don Julio Creek then exits the Base, flows through a residential area, and re-enters the Base near the northwest corner. From the northwest corner of the Base, Don Julio Creek continues as a gunite lined ditch and flows south along Patrol Road, turning west near the center of the Base and exiting the Base near Raley Boulevard. Absent the discharge of treated groundwater from the GWTS, there are periods of limited or no flow in Magpie Creek and Don Julio Creek.

In August 2005, the Discharger will modify operation of Outfall 002. The practice of continuously discharging up to 0.144 mgd of effluent water to GWTP Outfall 002 (Beaver Pond) will be modified to discharge into the Beaver Pond only when the water level in the pond is below 2 feet for 2 consecutive weeks. The water level in Beaver Pond will be monitored weekly. High water levels throughout most of the year make continuous discharge from Outfall 002 unnecessary for maintenance of the wetlands habitat.

### **Beneficial Uses**

The Basin Plan at page II-2.00 states that: “Existing and potential beneficial uses that currently apply to surface waters of the basins are presented in Figure II-1 and Table II-1. The beneficial uses of any specifically identified water body generally apply to its tributary streams.” The Basin Plan does not specifically identify beneficial uses for Magpie Creek, Don Julio Creek, Robla Creek, or the NEMDC, but the Basin Plan does identify existing beneficial uses for the Sacramento River to which they are tributary.

In Table II-1 the Basin Plan identifies the following existing **beneficial uses** of the Sacramento River, from the Colusa Basin Drain to the I Street Bridge, downstream of the discharge: municipal and domestic supply, agricultural irrigation, body contact water recreation, other non-body contact water recreation, warm freshwater aquatic habitat, cold freshwater aquatic habitat, warm fish migration habitat, cold fish migration habitat, warm spawning habitat, cold spawning habitat, wildlife habitat, and navigation.

The Basin Plan on page II-1.00 states: “Protection and enhancement of existing and potential beneficial uses are primary goals of water quality planning...” and with respect to disposal of wastewaters states that “... disposal of wastewaters is [not] a prohibited use of waters of the State; it is merely a use which cannot be satisfied to the detriment of beneficial uses.”

In reviewing what existing beneficial uses that may apply to Magpie Creek and Don Julio Creek, the Regional Board has considered the following facts:

1) *Domestic, Municipal, and Agricultural Irrigation Supply*

The Regional Board is required to apply the beneficial uses of municipal and domestic supply to Magpie Creek and Don Julio Creek based on SWRCB Resolution No. 88-63 which was incorporated into the Basin Plan pursuant to Regional Board Resolution 89-056. In addition, the SWRCB has issued water rights to existing water users along the Sacramento River downstream of the discharge for domestic and irrigation uses. As noted in reports provided by the Discharger, Magpie Creek and Don Julio Creek are losing streams, losing some of their surface flow to the subsurface vadose zone and groundwater zones via surface water infiltration. Groundwater is a source of domestic, municipal and irrigation supply water. In addition to the existing water uses, growth in the area, downstream of the discharge, is expected to continue, which presents a potential for increased domestic and agricultural uses of the water in Magpie Creek and Don Julio Creek. As noted previously, municipal and domestic supply are identified as existing beneficial uses of the Sacramento River.

2) *Water Contact and Non-Contact Recreation and Esthetic Enjoyment*

The Regional Board finds that the discharge flows through residential areas, and there is ready public access to Magpie Creek and Don Julio Creek. Exclusion of the public is unrealistic and contact recreational activities currently exist along the creeks. These uses are likely to increase as the population in the area grows.

3) *Preservation and Enhancement of Fish, Wildlife and Other Aquatic Resources.*

From the point of effluent discharge, Magpie Creek flows into the Magpie Creek Diversion which empties into Robla (Rio Linda) Creek. Robla Creek, in turn, empties into the Natomas East Main Drainage Canal (NEMDC). From this point the NEMDC flows south to the north side of the American River, then turns west, paralleling the American River before emptying into the Sacramento River just north of Discovery Park and upstream from the confluence with the American River. While the beneficial uses of Magpie Creek, are not identified in the Basin Plan, Table II-1 of the Basin Plan designates cold freshwater habitat (COLD) as an existing beneficial use of the Sacramento River, from the Colusa Basin Drain to the I Street Bridge, downstream of the discharge (#30, Hydro Unit Number 520.00). There is limited information on the specific types of habitats provided by Magpie Creek. However, Magpie Creek has been observed to retain pools of water several feet deep throughout the summer due to the GWTS effluent discharge. Magpie Creek, via Magpie Creek Diversion and Robla Creek, is tributary to, and in hydraulic continuity with the NEMDC during periods of the year. Information is available on the NEMDC which

suggests it has served in the past as an important migration pathway for cold water aquatic fish species like salmon and steelhead. There are no known permanent barriers to flow between Magpie Creek and the Natomas East Main Drainage Canal which would prevent the migration or movement of cold water species between the water bodies at times of the year. Use of the tributary language in the Basin Plan results in the designation of the COLD beneficial use to Magpie Creek. Evidence in the record suggests that the COLD beneficial use is an appropriate designation for Magpie Creek. Designation of the COLD beneficial use to Magpie Creek necessitates that the in-stream dissolved oxygen concentration be maintained at, or above, 7.0 mg/L (ppm). This approach recognizes that, if the naturally occurring in-stream dissolved oxygen concentration is below 7.0 mg/L (ppm), the Discharger is not required to improve the naturally occurring level.

Upon review of the flow conditions, habitat values, existing and potential beneficial uses of the Sacramento River, and the facts described above, the Regional Board finds that the beneficial uses identified in the Basin Plan for the Sacramento River, from the Colusa Basin Drain to the I Street Bridge, are applicable to Magpie Creek and Don Julio Creek.

The Regional Board also finds that based on available information that Magpie Creek and Don Julio Creek, absent the discharges, are at times seasonal and/or ephemeral waterbodies. This seasonal and/or ephemeral nature of Magpie Creek and Don Julio Creek means that the beneficial uses must be protected, but that no year-round credit for receiving water dilution is available. Although the discharges, at times, maintain the aquatic habitat, constituents may not be discharged that may cause harm to aquatic life. At other times, flows within Magpie Creek and/or Don Julio Creek help support aquatic life. Both conditions may exist within a short time span, where the creeks would be dry without the discharge and periods when sufficient background flows provide hydraulic continuity with the NEMDC and the Sacramento River. The lack of dilution results in more stringent effluent limitations to protect recreational uses and aquatic life. Significant dilution may occur during the irrigation season, and immediately following high rainfall events.

The Discharger may conduct flow monitoring of Magpie Creek and Don Julio Creek to determine the actual flow regime. To the extent seasonal assimilative capacity is available in the receiving water to accommodate constituents in the effluent which exceed reasonable potential criteria, this permit contains a re-opener to consider final effluent limitations based upon demonstrated assimilative capacity. However, effluent limitations contained in this permit do not account for the receiving waters having assimilative capacity. The Discharger may submit additional receiving water characterization to demonstrate the flow regime and pollutant assimilative capacity and ask the Regional Board to re-open the permit to consider this new information.

### **CTR, NTR, and SIP**

USEPA adopted the *National Toxics Rule* (NTR) on 5 February 1993 and the *California Toxics Rule* (CTR) on 18 May 2000. These Rules contain water quality standards applicable to this discharge. The State Water Resources Control Board (SWRCB) adopted the *Policy for*

*Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (known as the State Implementation Policy or SIP), which establishes requirements for implementation of the NTR and the CTR

Federal regulations require effluent limitations for all pollutants that are or may be discharged at a level that will cause or have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numeric water quality standard. The absence of a limitation for a constituent indicates either a lack of information is available for evaluation, or the constituent does not have the reasonable potential to cause, or contribute to an in-stream excursion above a narrative or numeric water quality standard. As a means of collecting additional information necessary to conduct a complete reasonable potential analysis, this Order contains provisions that:

- 1) Require the Discharger to provide information as to whether the levels of NTR, CTR, or other pollutants in the discharge have the reasonable potential to cause or contribute to an in-stream excursion above a numeric or narrative water quality standard, including Basin Plan numeric or narrative objectives and NTR and CTR pollutants;
- 2) If pollutants in the discharge have a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard, requires the Discharger to submit information to calculate effluent limitations for those pollutants; and
- 3) Allow the Regional Board to reopen this Order and include effluent limitations for those pollutants.

On 10 September 2001, the Executive Officer issued a letter, in conformance with Section 13267 of the California Water Code, requiring the Discharger to prepare a technical report assessing effluent and receiving water quality. A copy of that letter, including its Attachments I through IV, are incorporated into this Order as Attachment D. This Order includes a Provision that is intended to be consistent with the requirements of Attachment D in requiring sampling and reporting of NTR, CTR, and additional constituents to determine if the discharge has a reasonable potential to cause or contribute to an in-stream excursion above a water quality standard. The Discharger has fulfilled the above requirement by submitting the monitoring data on 26 February 2003.

### **303d Listed Constituents**

Areas of the Sacramento River, from Red Bluff to the Delta, have been identified as Water Quality Limited Segments under section 303(d) of the CWA. The list of pollutants for which portions of this stretch of the Sacramento River is impaired appears on a list (the "California 303(d) List"), which was most recently updated in 1998. Pollutants and/or conditions identified on the California 303(d) List as impairing the Sacramento River, from Red Bluff to the Delta, to which Magpie Creek and Don Julio Creek are tributary, include mercury, diazinon, and unknown toxicity.

### **Consideration of Effluent Limitations**



### **Technology Based Effluent Limitations**

Technology-based treatment requirements under section 301(b) of the CWA represent the minimum level of control that must be imposed in a permit issued under section 402 of the CWA.

Regulations promulgated at 40 CFR 122.44 (a) require technology-based effluent limitations to be placed in NPDES permits based on national effluent limitations guidelines and standards, best professional judgment (BPJ), or a combination of the two.

### **Volatile Organic Compounds (VOCs)**

Volatile organic compounds (VOCs) have been detected in influent groundwater, prior to treatment. Trichloroethene (TCE), tetrachloroethene (PCE), 1,2-dichloroethane (1,2 DCA), cis-1,2-dichloroethene (cis-1,2 DCE), 1,1-dichloroethane (1,1 DCA), 1,1-dichloroethene (1,1 DCE), vinyl chloride, and 1,1,1 trichloroethane (1,1,1 TCA) have been detected in the GWTS influent during the past year (January 2001 through December 2001). Hereafter, these detected VOC's shall be referred to as VOC constituents of concern (VOC CoC's). PCE and TCE are the most common VOC CoC's detected in McClellan's influent. This GWTS is designed and operated in part to remove VOC's from groundwater. The air stripping with GAC polishing technology utilized by this GWTS is capable of dependably removing VOC CoC's to concentrations that are less than current analytical technology Minimum Levels (ML's) specified by the SIP (ML is defined in Appendix 1 to the SIP). Therefore, technology based effluent limitations still apply to the discharge. This Order includes a daily maximum effluent limitation for the detected VOC CoC's of 1.0 µg/L (ppb), and includes a new monthly median limitation for the VOC Coc's of less than the analytical technique ML's specified by Appendix 4, Table 2a, of the SIP (or later amendment if new ML's are adopted by the SWRCB).

### **Pesticides**

Previous Order No. 99-067 included a daily maximum effluent limitation of 'non-detectable' for **pesticides** associated with Method 8081. These pesticides are identified in Appendix 4, Table 2d of the SIP. Influent and effluent samples from the GWTS, and receiving water samples have been analyzed for pesticides twice each year. Pesticides have not been detected in the influent or effluent during the past year (January 2001 through December 2001). However, data for some of the pesticides was not of sufficient quality for comparison with CTR water quality criteria and water quality objectives for pesticides in the Basin Plan considering laboratory ML's specified by the SIP. The air stripping with GAC polishing technology utilized by this GWTS is capable of dependably removing pesticides to concentrations that are less than current analytical technology ML's specified by the SIP. Therefore, technology based effluent limitations still apply to the discharge. This Order retains a daily maximum effluent limitation for pesticides (those identified in Table 2d of Appendix 4 to the SIP) of less than the analytical technique ML's specified by Appendix 4, Table 2d, of the SIP (or later amendment if new ML's are adopted by the SWRCB).

### **Reasonable Potential Analyses**

Where technology-based effluent limitations are inadequate to ensure compliance with water quality standards applicable to the receiving water, more stringent effluent limits based upon applicable water quality standards are imposed.

### **Water Quality Based Effluent Limitations**

Federal regulations, 40 CFR Part 122.44 (d)(1)(i), require that NPDES permit effluent limitations must control all pollutants which are or may be discharged at a level which will cause or have the reasonable potential to cause or contribute to an in-stream excursion above any State water quality standard, including any narrative criteria for water quality. Beneficial uses, together with their corresponding water quality objectives, constitute the state water quality standards for purposes of compliance with the Clean Water Act.

The Porter Cologne Water Quality Control Act defines water quality objectives as “...*the limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific area*”. Water quality objectives designed to protect beneficial uses and prevent nuisances are found in the Basin Plan, and may be stated in either numerical or narrative form.

In determining whether a discharge has the reasonable potential to contribute to an in-stream excursion (reasonable potential analysis), the dilution of the effluent in the receiving water may be considered where areas of dilution are defined. The available dilution may also be used to calculate protective effluent limitations by applying water quality criteria at the edge of the defined mixing zone. These calculations include receiving water pollutant concentrations that are typically based on worst-case conditions for flow and concentration.

If limited or no dilution is available, effluent limitations are set equal to the applicable water quality criteria which are applied at the point of discharge so the discharge will not cause the receiving stream to exceed water quality objectives established to protect the beneficial uses. In situations where receiving water flows are documented, dilution may be considered in establishing effluent limitations. However, when a receiving water is impaired by a particular pollutant or stressor, limited or no pollutant assimilative capacity may be available in spite of the available dilution. In these instances, and depending upon the nature of the pollutant, effluent limitations may be set equal to or less than the applicable water quality criteria that are applied at the point of discharge such that the discharge will not cause or contribute to the receiving stream excursion above water quality objectives established to protect the beneficial uses.

### **Data Adjustments**

In most situations, EPA's NPDES regulations require that limits for metals in permit's be stated as total recoverable. Since most water quality criteria are expressed in the dissolved form, it is necessary to translate between dissolved metal in ambient waters and total recoverable metal in effluent. EPA guidance on the use of translators provides three options including, (1) assuming the translator equivalent to the criteria guidance conversion factor, (2) developing a translator directly

as the ratio of dissolved to total recoverable metal, and/or, (3) developing a translator through the use of a partitioning coefficient. Reasonable potential analysis for this permit was conducted using the first option, applying criteria guidance conversion factors. To assure that metals criteria are appropriate for the chemical conditions under which they are applied, EPA also provides for adjustment of the criteria through application of the water-effect ratio (WER). The WER approach compares bioavailability and toxicity of a specific pollutant in receiving waters and in laboratory waters. For this permit, reasonable potential analysis was conducted using a WER default value of 1. As described in the CTR, freshwater aquatic life criteria for certain metals are expressed as a function of hardness, since hardness, and/or water quality characteristics that are usually correlated with hardness can reduce or increase the toxicities of some metals.

Hardness is used as a surrogate for a number of water quality characteristics which affect the toxicity of metals in a variety of ways. To ensure the level of protection intended by the EPA's 1985 Guidelines for hardness is maintained or exceeded, the minimum observed hardness of the upstream water that does not contain effluent should be used to adjust the applicable criterion. Limited receiving water and effluent hardness data has been collected by the Discharger, as it was not required to be collected by previous Order monitoring programs. For purposes of the reasonable potential analysis, hardness dependent criteria have been adjusted where appropriate using the limited amount of hardness data that has been collected. The minimum observed hardness of Magpie Creek, upstream of the point of effluent discharge, was reported as 33 mg/L (ppm) as CaCO<sub>3</sub> (on 4/15/02). The hardness of Magpie Creek downstream of the point of effluent discharge has not been assessed. For purposes of the reasonable potential analysis, hardness dependent criterion were adjusted using these lowest observed hardness levels of Magpie Creek, upstream of the point of effluent discharge. The reasonable potential analysis for hardness dependent criteria may be reconsidered upon collection of additional constituent and hardness data as required by the 10 September 2001 *Requirement to Submit Monitoring Data* Letter. This Order may be reopened at that time.

### **Evaluation of Priority Pollutants Requiring Water Quality Based Effluent Limitations**

Section 1.3 of the SIP requires that the Regional Board to conduct an analysis for each priority pollutant with an applicable criterion or objective to determine if a water quality based effluent limitation is required. Attachment C summarizes final effluent inorganic priority pollutant data collected from the GWTS during the most recent periods of discharge to Magpie Creek. Attachment C also includes a summary of aquatic life and human health criteria for each inorganic priority pollutant. The Criteria Maximum Concentration (CMC) is defined by USEPA as the water quality criteria to protect against acute effects in aquatic life and is the highest in stream concentration of a priority toxic pollutant consisting of a short-term average not to be exceeded more than once every three years on the average. The Continuous Criteria Concentration (CCC) is the water quality criteria to protect against chronic effects in aquatic life and is the highest in stream concentration of a priority toxic pollutant consisting of a 4-day average not to be exceeded more than once every three years on the average. The CTR also includes human health criteria for many priority pollutants.

### **Calculation of Effluent Limitations**

At Section 1.4, the SIP provides four methods for developing water quality based effluent limitations necessary to control a priority pollutant. These methods include:

1. Use of a Waste Load Allocation based upon the results of a TMDL
2. Use of Steady State Model(s)
3. Use of Dynamic Model(s)
4. Established effluent limitations which consider intake water pollutants

### **Data Quality/Discussion of RPA for Specific Pollutants**

Based upon effluent and receiving water data provided by the Discharger, and the methods prescribed by the SIP, priority pollutants for which a water quality based effluent limitation is required based upon available data are described in greater detail below. Where pollutant information was not sufficient, this Order requires the collection of additional effluent and background water quality data of sufficient quality for comparison with appropriate criteria, and may be reopened if collected data indicate concentrations of pollutants are or may be discharged at a level which will cause or have the reasonable potential to cause or contribute to an in-stream excursion above the appropriate criteria.

#### **Antimony**

Previous Order No. 99-067 included a daily maximum and a monthly average limitation for antimony of 40 µg/L (ppb). The basis for these limitations was not described in the previous Order. The CTR provides a human health criterion for antimony of 14 µg/L (ppb). Consideration of this criterion in the reasonable potential analysis is appropriate as the beneficial uses of Magpie Creek and Don Julio Creek include municipal and domestic water supply. Results of effluent and receiving water monitoring since January 2001 indicate antimony has not been detected at or above laboratory reporting levels, to less than 5 µg/L (ppb), during that time period. Effluent and receiving water data collected since January 2001 represents new information which was not available at the time of adoption of the previous Order. Considering these facts, the effluent limitations for antimony from previous Order No. 99-067 have been removed from this Order (new information). This Order does require continued effluent and receiving water monitoring for antimony, and may be re-opened if antimony is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above the CTR/NTR criteria.

#### **Hexavalent Chromium**

Previous Order No. 99-067 included daily maximum and monthly average effluent limitations for hexavalent chromium based upon USEPA aquatic life ambient water quality criteria, and a factor of safety. Order No. 99-067 included a daily maximum limitation for hexavalent chromium of 15µg/L (ppb), and a monthly average limitation for hexavalent chromium of 10 µg/L (ppb). Subsequent to the adoption of Order No. 99-067, USEPA published the CTR, and the SWRCB adopted the SIP. New limits for hexavalent chromium have been established in this Order based upon the reasonable

potential to exceed the chronic freshwater aquatic life criterion in the CTR, and in accordance with procedures specified by the SIP (new information). Results of effluent monitoring conducted by the Discharger indicate maximum effluent concentrations (MECs) of hexavalent chromium have been reported as high as 15 ug/L (ppb) (4/01). Without regard to dilution, this MEC exceeds the CTR freshwater chronic aquatic life Continuous Criterion Concentration for hexavalent chromium of 11 ug/L (ppb).

Section 1.3 of the SIP requires a water quality based effluent limitation when the MEC exceeds appropriate pollutant criterion. New water quality based effluent limitations have been calculated based upon methodologies in the SIP.

When required, Section 1.4 of the SIP provides four methods that may be used to develop effluent limitations. These four methods include: (1) assigning a loading allocation based upon a completed TMDL; (2) use of a steady state model; (3) use of a dynamic model; or, (4) establishing effluent limitations that consider intake water pollutants.

Considering that Magpie Creek and Don Julio Creek may, at times, have little or no flow and provide little or no assimilative capacity for hexavalent chromium, final water quality based effluent limitations have been developed using the steady state model in the SIP, with no credit provided for dilution. The chronic effluent concentration allowance (ECA) was set equal to the chronic aquatic life criterion for hexavalent chromium, and the long-term average (LTA) discharge condition was determined using Table 1 of the SIP, using a coefficient of variation (CV) calculated using the results of the 39 hexavalent chromium sampling events conducted since December 2000 (CV=2.3) (39 data points, as summarized in Table A-1 of the July 2002 GWTS Monthly Operations Report). The average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) were then calculated using multipliers in Table 2 of the SIP as shown below:

<b><u>WATER QUALITY BASED EFFLUENT LIMITATIONS</u></b>	
<b><u>Hexavalent Chromium</u></b>	
Number of Observations	39
Effluent Maximum	15
Dilution Credit	0
ECA chronic	11 µg/L
Percent of Observations Below Detection	<90%
Coefficient of Variation (Calculated)	0.23
Limiting LTA (chronic) = (ECA chronic*Table 1 Chronic Multiplier)	8.5
Sampling Frequency (n)	≤ 4/mo
AMEL (LTA*Table 2 AMEL Multiplier)	<b>10.0 µg/L (ppb)</b>
MDEL (LTA*Table 2 MDEL Multiplier)	<b>14.1 µg/L (ppb)</b>

Final average monthly (10.0 µg/L (ppb)) and maximum daily (14.1 µg/L (ppb)) effluent limitations for hexavalent chromium have been established in this Order in accordance with Sections 1.3 and 1.4 of the SIP. The Discharger may be unable to meet these new effluent limitations for hexavalent

chromium. The GWTS has no processes specific to the removal of hexavalent chromium. The Discharger is currently investigating sources of hexavalent chromium in individual groundwater extraction wells and investigating ways to reduce hexavalent chromium concentrations in the final effluent. Section 2.1 of the SIP provides that: *“Based on an existing discharger’s request and demonstration that it is infeasible for the discharger to achieve immediate compliance with a CTR criterion, or with an effluent limitation based on a CTR criterion, the RWQCB may establish a compliance schedule in an NPDES permit.”* As the average monthly and maximum daily effluent limitations for hexavalent chromium are new requirements in this Order, the Discharger has not been afforded an opportunity to submit the compliance schedule justification required by the SIP. This Order requires the Discharger to provide this information. Implementation of the new water quality based effluent limitations for hexavalent chromium become effective on **25 June 2003** if a compliance schedule justification is not completed and submitted by the Discharger to the Regional Board. Otherwise, final water quality based effluent limitations for hexavalent chromium become effective **1 March 2008**.

In accordance with the SIP Section 2.2.1, numeric interim limitations for hexavalent chromium are required in this Order. Numeric interim limitations have been established based upon treatment facility performance. These interim limitations consist of projected maximum daily and monthly average effluent concentrations derived using daily sample data collected during periods of discharge since December 2000 (39 data points, as summarized in Table A-1 of the July 2002 GWTS Monthly Operations Report), and applying the statistical methodologies for estimating maximum concentrations identified in Chapter 3 of USEPA’s Technical Support Document for Water Quality-based Toxics Control (TSD). Where concentrations were reported as less than detectable, one half of the detection limit was used in the calculation. Derivation of these interim limitations is summarized below:

INTERIM EFFLUENT LIMITATIONS	
<u>Hexavalent Chromium</u>	
Number of Observations	39
Minimum (µg/l)	0.5
Observed Maximum (µg/l)	<b>15.0</b>
Mean	9.5
Standard Deviation	2.156
Coefficient of Variation	0.23
Multiplier <sup>1</sup>	1.3
Projected Daily Maximum	<b>19.5 (µg/l)</b>
Multiplier <sup>2</sup>	1.1
Projected Monthly Average	<b>16.5 (µg/l)</b>

<sup>1</sup> From TSD Table 3-1

<sup>2</sup> From TSD Table 3-2

These interim limitations shall be enforceable limitations until the final maximum daily and monthly average effluent limitations become effective on 1 March 2008 or 25 June 2003 if a compliance schedule justification is not submitted.

### **Total Chromium**

Previous Order No. 99-067 included daily maximum and monthly average effluent limitations for total chromium (80 µg/L (ppb), and 50 µg/L (ppb) respectively). These limitations were based upon the California primary MCL of 50 µg/L (ppb). The CTR does not include criteria for total chromium. Results of monitoring conducted by the Discharger indicate that the MEC for total chromium since the GWTS began operation has been less than 20 µg/L (ppb). Comparison of result for total chromium to hexavalent chromium suggest that the hexavalent chromium component may compose most if not all of the total chromium concentration. Final effluent limitations protective for hexavalent chromium, and significantly less than 50 µg/L (ppb), have been established in this Order. Considering these facts, the effluent from the GWTS has not demonstrated the reasonable potential to cause or contribute to an in-stream excursion above applicable water quality criteria for total chromium. The effluent limitations for total chromium from previous Order No. 99-067 have been removed from this Order (new information). This Order does require continued effluent and receiving water monitoring for total chromium, and may be re-opened if total chromium is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above appropriate water quality criteria.

### **Selenium**

Results of effluent monitoring of the GWTS indicates the MEC's of total selenium in the final effluent are typically less than the analytical reporting limit of 5 µg/L (ppb). However, selenium was detected in the final effluent above the laboratory reporting limit of 5 ug/L (ppb) on two occasions (7 ug/L (ppb) (June 2001) and 11 ug/L (ppb) (October 2001). The CTR, at 40 CFR 131.38, includes a CCC criterion for selenium expressed in the total recoverable form. While other criteria for selenium were promulgated for specific waters in California in the NTR, it is the 5 µg/L (ppb) chronic criterion which applies to additional waters of the United States in the State of California pursuant to 40 CFR 131.38(c). Since the preservation and enhancement of fish, wildlife, and other aquatic resources and habitats is an existing beneficial use of Magpie Creek and Don Julio Creek, this criterion applies to these waters. Without regard to dilution, these MEC's exceed the CTR freshwater chronic aquatic life Continuous Criterion Concentration for selenium of 5 ug/L (ppb).

Section 1.3 of the SIP requires a water quality based effluent limitation when the MEC exceeds appropriate pollutant criterion. New water quality based effluent limitations for selenium have been calculated based upon methodologies in the SIP.

Considering that Magpie Creek and Don Julio Creek may, at times, have little or no flow and provide little or no assimilative capacity for selenium, final water quality based effluent limitations have been developed using the steady state model in the SIP, with no credit provided for dilution. The chronic effluent concentration allowance (ECA) was set equal to the chronic aquatic life criterion for selenium, and the long-term average (LTA) discharge condition was determined using

Table 1 of the SIP, using a default coefficient of variation (CV) of 0.6 (>80 percent of the data reported as not detected). The average monthly effluent limitation (AMEL) and maximum daily effluent limitation (MDEL) were then calculated using multipliers in Table 2 of the SIP as shown below:

<b><u>WATER QUALITY BASED EFFLUENT LIMITATIONS</u></b>	
<u>Selenium (total)</u>	
Number of Observations	11
Effluent Maximum	11
Dilution Credit	0
ECA chronic	5 µg/L
Percent of Observations Below Detection	> 80%
Coefficient of Variation (Default)	0.6
Limiting LTA (chronic) = (ECA chronic*Table 1 Chronic Multiplier)	2.635
Sampling Frequency (n)	< 4/mo
AMEL (LTA*Table 2 AMEL Multiplier)	<b>4.1 µg/L (ppb)</b>
MDEL (LTA*Table 2 MDEL Multiplier)	<b>8.2 µg/L (ppb)</b>

Final average monthly (4.1 µg/L (ppb)) and maximum daily (8.2 µg/L (ppb)) effluent limitations for selenium have been established in this Order in accordance with Sections 1.3 and 1.4 of the SIP. The Discharger may be unable to meet these new effluent limitations for selenium, and the he GWTS has no processes specific to the removal of selenium. Section 2.1 of the SIP provides that: *“Based on an existing discharger’s request and demonstration that it is infeasible for the discharger to achieve immediate compliance with a CTR criterion, or with an effluent limitation based on a CTR criterion, the RWQCB may establish a compliance schedule in an NPDES permit.”* As the average monthly and maximum daily effluent limitations for selenium are new requirements in this Order, the Discharger has not been afforded an opportunity to submit the compliance schedule justification required by the SIP. This Order requires the Discharger to provide this information. Implementation of the new water quality based effluent limitations for selenium become effective on **25 June 2003** if a compliance schedule justification is not completed and submitted by the Discharger to the Regional Board. Otherwise, final water quality based effluent limitations for selenium become effective **1 March 2008**.

In accordance with the SIP Section 2.2.1, numeric interim limitations for selenium are required in this Order. Previous Order No. 99-067 included a daily maximum and monthly average effluent limitations for selenium of 10 µg/L (ppb). The daily maximum effluent limitation of the previous Order No. 99-067 has been retained in this Order as a numeric interim limitation. This interim limitation shall be an enforceable limitation until the final maximum daily and monthly average effluent limitations become effective on 1 March 2008.

#### **Cadmium (total)**

Results of effluent monitoring of the GWTS indicates concentrations of total cadmium in the final effluent have been less than the analytical reporting limit of 0.5 µg/L (ppb). More recent



monitoring results indicate concentrations of total cadmium in the final effluent are less than the analytical reporting limit of 0.25 µg/L (ppb). As shown in Attachment C, these data indicate that the MEC's of total cadmium in the final effluent do not have the reasonable potential to exceed the lowest (most stringent) water quality criterion for total cadmium. Receiving water monitoring of Magpie Creek and Don Julio Creek has not been completed. This Order requires continued effluent and receiving water monitoring for cadmium, and may be re-opened if it is found that cadmium is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above the CTR/NTR criteria.

**Copper (total)**

Results of effluent monitoring of the GWTS indicates the MEC of total copper in the final effluent was reported as an estimated 0.16 µg/L (ppb) (estimated as it was detected but not quantified, between the method detection limit (0.007 µg/L (ppb)) and the reporting limit (0.5 µg/L (ppb))). As shown in Attachment C, these data indicate that the MEC of total copper in the final effluent does not have the reasonable potential to exceed the lowest (most stringent) water quality criterion for total copper. Receiving water monitoring of Magpie Creek and Don Julio Creek has not been completed. This Order requires continued effluent and receiving water monitoring for copper, and may be re-opened if it is found that copper is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above the CTR/NTR criteria.

**Lead (total)**

Results of effluent monitoring of the GWTS indicates the MEC of total lead in the final effluent was reported as an estimated 0.02 µg/L (ppb) (estimated as it was detected but not quantified, between the method detection limit (0.01 µg/L (ppb)) and the reporting limit (0.5 µg/L (ppb))). As shown in Attachment C, these data indicate that the MEC of total lead in the final effluent does not have the reasonable potential to exceed the lowest (most stringent) water quality criterion for total lead. Receiving water monitoring of Magpie Creek and Don Julio Creek has not been completed. This Order requires continued effluent and receiving water monitoring for lead, and may be re-opened if it is found that lead is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above the CTR/NTR criteria.

**Nickel (total)**

Results of effluent monitoring of the GWTS indicates the MEC of total nickel in the final effluent was reported as an estimated 0.8 µg/L (ppb) (estimated as it was detected between the method detection limit (0.2 µg/L (ppb)) and the reporting limit (1.0 µg/L (ppb))). As shown in Attachment C, these data indicate that the MEC of total nickel in the final effluent does not have the reasonable potential to exceed the lowest (most stringent) water quality criterion for total nickel. Receiving water monitoring of Magpie Creek and Don Julio Creek has not been completed. This Order requires continued effluent and receiving water monitoring for nickel, and may be re-opened if it is found that nickel is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above the CTR/NTR criteria.

### **Zinc (total)**

Results of effluent monitoring of the GWTS indicates the MEC of total zinc in the final effluent was reported as 30 µg/L (ppb) (04/01). As shown in Attachment C, the data indicate that concentrations of total zinc in the final effluent do not have the reasonable potential to exceed the lowest (most stringent) water quality criterion for total zinc. Receiving water monitoring of Magpie Creek and Don Julio Creek has not been completed. This Order requires continued effluent and receiving water monitoring for zinc, and may be re-opened if it is found that zinc is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above the CTR/NTR criteria.

### **Mercury**

Previous Order No. 99-067 included a daily maximum and a monthly average effluent concentration limitation for mercury (1.0 µg/L (ppb) and 0.012 µg/L (ppb), respectively). The Basin Plan does not provide a numeric water quality objective for mercury. The current USEPA water quality criteria for mercury, for protection of human health for consumption of both water and organisms, is 0.050 µg/L (ppb). The USEPA is currently reviewing the ambient water quality criteria for mercury and may recommend more stringent criteria, based in part on organism uptake and bioaccumulation. The Sacramento River, from Red Bluff to the Delta, has been listed as an impaired water body pursuant to Section 303(d) of the Clean Water Act for mercury, based on fish tissue concentration and not water column toxicity. The California DHS has issued health warnings regarding the consumption of fish from Delta waterways. While Magpie Creek and Don Julio Creek are not identified as impaired for mercury on the California 303(d) list, additional loading resulting from the discharge from the Discharger's GWTS has the potential to cause or contribute to the impairment resulting from mercury bioaccumulation in the Sacramento River and Delta. A TMDL for mercury is currently scheduled to be completed by December 2005.

At Section 2.1.1 the SIP states: *"For bioaccumulative priority pollutants for which the receiving water has been included on the CWA Section 303(d) list, the RWQCB should consider whether the mass loading of the bioaccumulative pollutant(s) should be limited to representative, current levels pending TMDL development in order to implement the applicable water quality standard"*. Since mercury is a bioaccumulative pollutant included on the CWA 303(d) list for the Sacramento River and Delta, the intent of this Order is to include an interim performance based effluent limitation for mercury.

Results of limited 'ultra-clean' sampling and analysis conducted by the Discharger using EPA Method SW 1631 indicate GWTP effluent mercury concentrations ranged from < 0.0039 µg/L (ppb) to 0.017 µg/L (ppb). These concentrations do not exceed the CTR human health criteria. Current mercury data are not sufficient for establishment of an interim performance based limitation. This Order requires the Discharger to collect data necessary to establish an interim performance based effluent mass limitation.

Performance-based effluent limits for mercury are typically established as follows: 1) The average monthly effluent mercury concentration is calculated by adding all detected concentrations and one-half of the reported detection levels of all non-detectable mercury concentration results; 2) From the average monthly mercury concentration and average monthly flow, a monthly mercury mass discharge is calculated; and 3) A total mass for all months is then totaled, and an average annual mass discharge is calculated.

Following the establishment of the interim limit, the mass of mercury discharged shall not exceed the interim mercury mass limit twelve months on a running average. In calculating for compliance, the Discharger shall count all non-detect measures at one-half of the detection level and apply the monthly average flow from the sampled discharge. If compliance with the effluent limit is not attained due to the non-detect contribution, the Discharger will be directed to improve and implement available analytical capabilities and compliance will be evaluated with consideration of the detection limits. For each calendar month, the Discharger shall calculate twelve-month mass loadings. For monthly measures, monthly loadings shall be calculated using the average monthly flow and the average of all mercury analyses conducted that month. The Discharger shall submit a cumulative total of mass loadings for the previous twelve months with each self-monitoring report. Compliance will be determined based on the previous 12-month moving averages over the previous twelve months of monitoring.

Until sufficient data are collected to establish a performance based interim effluent mass limitation, this Order shall include a preliminary monthly average mercury concentration limitation using the concentration limitation of the previous Order (0.000012 mg/L (ppm)). Upon completion of the Interim Mercury Mass Limitation Study required by this Order, this Order shall be reopened and an interim performance based mercury mass effluent limitation established. Final effluent limitations may include: a waste load allocation derived from the TMDL, or a site specific water quality objective.

The economic effect of the provisions of this permit on the discharger is nominal. When established, the interim mercury effluent limits require the discharger to simply maintain current plant performance.

#### **Trace Element Water Quality Objectives**

Specific trace element water quality objectives which apply to surface waters in the Sacramento and San Joaquin River Basins, including the Sacramento River, from Keswick Dam to the I Street Bridge, are provided in Table III-1 of Chapter III of the Basin Plan. These objectives are summarized in the table below:

Constituent	Maximum Concentration (µg/l)
Arsenic (dissolved)	10
Barium (dissolved)	100
Copper (dissolved)	10
Cyanide (dissolved)	10
Iron (dissolved)	300
Manganese (dissolved)	50
Silver (dissolved)	10
Zinc (dissolved)	100

Trace metal objectives in this table are dissolved concentrations. This Order requires the collection of additional effluent and receiving water data necessary to assess the impact of the discharge on these dissolved trace metal water quality objectives of the Sacramento River.

### Toxicity

At p.III-9.00 the Basin Plan provides that relative to toxicity : *“All waters shall be maintained free of toxic substances in concentrations that produce detrimental physiological responses in human, plant, animal, or aquatic life.”* At page 1, the USEPA’s Technical Support Document for Water Quality-based Toxics Control (TSD) provides that *“Where States have not developed chemical specific numeric criteria, States may interpret their narrative standards for specific chemicals by using EPA criteria updated with current quantitative risk values.”* The TSD further states on page 1 *“The integrated approach must include the control of toxics through implementation of the “no toxics” criterion and/or numeric criteria for the parameter of toxicity, the control of individual pollutants for which specific chemical water quality criteria exist in a state’s standard, as well as the use of biological criteria. Reliance solely on the chemical specific numeric criteria or the narrative criterion or biological criteria would result in only a partially effective State toxics control program.”*

Under the CWA Section 304(a), EPA has developed methodologies and specific criteria guidance to protect aquatic life and human health. These methodologies are intended to provide protection for all surface waters on a national basis. The methodologies have been subject to public review, as have the individual criteria guidance documents. Water quality criteria developed under Section 304(a) of the CWA are based solely on data and scientific judgments on the relationship between pollutant concentrations and environmental and human health effects. Section 304(a) criteria do not reflect consideration of economic impacts or the technological feasibility of meeting the chemical concentrations in ambient water. Section 304(a) criteria provide guidance to States in adopting water quality standards that ultimately provide a basis for controlling discharges or releases of pollutants. USEPA’s ambient water quality criteria have been used as a means of supplementing the integrated approach to toxics control, and in some cases deriving numeric limitations to protect receiving waters from toxicity as required in the Basin Plan’s narrative standard prohibiting the discharge of toxic constituents in toxic amounts.

As noted previously, pollutants and/or conditions identified on the California 303(d) List as impairing the Sacramento River, from Red Bluff to the Delta, to which Magpie Creek and Don Julio Creek are tributary, include unknown toxicity. This Order requires acute toxicity monitoring of the effluent and chronic toxicity monitoring of the effluent and receiving water (Whole Effluent Toxicity (WET) testing) to ensure the discharge is not contributing additional toxicity to the receiving waters, and includes notification and follow-up procedures in the event toxic endpoints are observed. If it is determined that the discharge causes or contributes to chronic toxicity in Magpie Creek and/or Don Julio Creek, the Discharger is required to conduct a toxicity identification evaluation (TIE) and/or toxicity reduction evaluation (TRE). The TRE includes all reasonable steps to identify and eliminate the source(s) of toxicity. Based upon the results of the TRE, this Order may be reopened to include a chronic toxicity limitation and/or a limitation for the specific toxicant identified in the TRE.

### **Dissolved Oxygen**

Previous Order No. 99-067 included receiving water limitations for dissolved oxygen. Receiving Water Limitation B.1 of previous Order No. 99-067 stated "The discharge shall not cause the dissolved oxygen concentration in Magpie Creek to fall below 5.0 mg/l." As noted previously (Beneficial Uses Section), the Basin Plan (Table II-1) designates the Sacramento River as being both a cold and warm freshwater habitat. Therefore, pursuant to the Basin Plan, the COLD, or cold water habitat designation, applies to Magpie Creek and Don Julio Creek. The cold-water habitat designation necessitates that the in-stream dissolved oxygen concentration be maintained at, or above, 7.0 mg/L (ppm). This approach recognizes that, if the naturally occurring in-stream dissolved oxygen concentration is below 7.0 mg/L (ppm), the Discharger is not required to improve the naturally occurring levels. This Order contains receiving water limitations for Magpie Creek and Don Julio Creek which specify that the in-stream dissolved oxygen concentration of these waters be maintained at, or above, 7.0 mg/L (ppm).

### **1,4 Dioxane**

Results of effluent monitoring of the GWTS indicates detectable concentrations of **1,4-dioxane** in the final effluent were reported between 1.6 to 2.1ug/L (ppb) (03/03). There is currently insufficient data to determine whether concentrations of 1,4-dioxane in the final effluent have reasonable potential to exceed the lowest (most stringent) water quality criterion for 1,4-dioxane. This Order adds a requirement for monthly effluent water monitoring for 1,4-dioxane, and may be re-opened if it is found that 1,4-dioxane is or may be discharged at a level that will cause or have the reasonable potential to cause or contribute to an in-stream excursion above a water quality standard.